

① i) $\frac{x}{2} + 3$

ii) $2x, 2x+2, 2x+4$

iii) $\frac{x}{4} + \frac{x}{5}$

iv) $3x^2$

v) $x^2 - (x+1)^2$

vi) \sqrt{x}

vii) $2x+3 = 15$

viii) $x^3 = 27$

ix) $2x^3$

x) $(2x)^3$

② i) $9 - 2(x+4) - 10(25-x+4) = 5 - 3x - 4(x+1)$

$$9 - 2x - 8 - 250 + 10x - 40 = 5 - 3x - 4x - 4$$

$$2x + 10x + 3x + 4x = 5 - 4 - 9 + 8 + 250 + 40$$

$$17x = 290$$

$$x = \frac{290}{17}$$

ii) $\frac{7x}{3} + \frac{13}{2} - \frac{7x}{6} = \frac{17}{12} - \frac{3x}{4}$

$$\frac{28x}{12} + \frac{78}{12} - \frac{14x}{12} = \frac{17}{12} - \frac{9x}{12}$$

$$28x + 78 - 14x = 17 - 9x$$

$$28x - 14x + 9x = 17 - 78$$

$$23x = -61$$

$$\boxed{x = -\frac{61}{23}}$$

$$\text{iii)} \quad \frac{23x}{20} + 4x - \frac{13}{15} = \frac{7x}{5} + \frac{4x-5}{20}$$

$$\text{m.c.m.}(20, 15, 5) = 3 \cdot 2^2 \cdot 5 = 60$$

$\downarrow \quad \downarrow$
 $2^2 \cdot 5 \quad 3 \cdot 5$

$$\frac{69x}{60} + \frac{240}{60} - \frac{52}{60} = \frac{84x}{60} + \frac{12x-15}{60}$$

$$69x + 240 - 52 = 84x + 12x - 15$$

$$69x - 84x - 12x = -15 + 52$$

$$-27x = 40$$

$$x = \frac{40}{-27}$$

$$\boxed{x = -\frac{40}{27}}$$

$$\text{iv)} \quad \frac{x-4}{4} - \frac{5x+3}{32} = \frac{7}{16} - \frac{5x}{8}$$

$$\frac{8x-32}{32} - \frac{5x+3}{32} = \frac{14}{32} - \frac{20x}{32}$$

$$8x - 32 - 5x - 3 = 14 - 20x$$

$$8x + 20x - 5x = 14 + 32 + 3$$

$$23x = 49$$

$$\boxed{x = \frac{49}{23}}$$

$$\text{v)} \quad \frac{6x+1}{12} - \frac{x-13}{9} = \frac{5x-3}{2} + \frac{x}{30}$$

$$\text{m.c.m.}(12, 9, 2, 30) = 3^2 \cdot 2^2 \cdot 5 \Rightarrow 180$$

$$\hookrightarrow 12 = 2^2 \cdot 3 \parallel 9 = 3^2 \parallel 30 = 3 \cdot 2 \cdot 5$$

$$\frac{90x+15}{180} - \frac{20x-260}{180} = \frac{450x-270}{180} + \frac{6x}{180}$$

$$90x + 15 - 20x + 260 = 450x - 270 + 6x ; \quad -386x = -545$$

$$\boxed{x = \frac{545}{386}}$$

$$\text{vi)} \quad \frac{3x+8}{10} - \frac{9x-9}{14} = \frac{31x-4}{14} + \frac{4x-1}{35}$$

$$\text{m.c.m.}(10, 14, 35) \begin{cases} 10 = 2 \cdot 5 \\ 14 = 2 \cdot 7 \\ 35 = 5 \cdot 7 \end{cases} \Rightarrow 2 \cdot 5 \cdot 7 = \underline{70}$$

$$\frac{21x+56}{70} - \frac{45x-45}{70} = \frac{155x-20}{70} + \frac{8x-2}{70}$$

$$21x+56-45x+45 = 155x-20+8x-2$$

$$21x-45x-155x-8x = -20-2-56-45$$

$$-187x = -123$$

$$x = \frac{-123}{-187}$$

$$\boxed{x = \frac{123}{187}}$$

$$\text{vii)} \quad \frac{8-4x}{3} - 2(5x+8) = \frac{2(4x+6)}{9} + 2(10x+1)$$

$$\frac{8-4x}{3} - 10x - 16 = \frac{8x+12}{9} + 20x + 2$$

$$\frac{24-12x}{9} - \frac{90x}{9} - \frac{144}{9} = \frac{8x+12}{9} + \frac{180x}{9} + \frac{18}{9}$$

$$24-12x-90x-144 = 8x+12+180x+18$$

$$12x-90x-8x-180x = 12+18-24+144$$

$$-266x = 150$$

$$x = \frac{150}{-266}$$

$$\boxed{x = \frac{-150}{266} = \frac{-75}{133}}$$

$$\text{viii)} \quad \frac{6x-19}{6x+1} = 5$$

$$6x-19 = 5(6x+1)$$

$$6x-19 = 30x+5$$

$$6x-30x = 5+19$$

$$-24x = 24$$

$$x = \frac{24}{-24}$$

$$\boxed{x = -1}$$

$$\text{ix)} \quad \frac{121-2x}{x} = \frac{5}{3}$$

$$3(121-2x) = 5x$$

$$363-6x = 5x$$

$$5x+6x = 363$$

$$11x = 363$$

$$x = \frac{363}{11}$$

$$\boxed{x = 33}$$